1. Reduction of classical mechanics to QM.
   correspondence relations
      — diachronic, synchronic

   Limiting relations for wave equation
      Show ①

2. Metaphysical reduction
      Reduction of electron states to electromagnetism
         Show ②

3. Part–whole reductions:
      case of classical atomic physics
         Show ③
      (always appears Cartesian product
      for combined phase space).

4. Quantum Entanglement and quantum holism.
      Entangled states and the
   attenuation interpretation.
         Show ④

   Beyond Redhead: show ⑤ and ⑥

   Stochastic h-v
      theories: show ⑦ and ⑧

   Power-at-a-distance   show ⑨

1. Limiting relations
2. Reduction of electrostatics to electromagnetism
3. Part – whole reductions (classical phase space)
4. Quantum Entanglement
5. Heywood – Redhead result
6. " " " cntd.
   (FUNC*, VR, OLOC, BLOC)

7. Stochastic hidden – variable theories
8. Outcome – dependence & parameter dependence
9. Causality outcome dependence robustness and frozen at-a-distance.

Introduction In my experience it is biologists and maybe chemists (like Peter Atkins) who are dyed-in-the-wool reductionists, in a crude sense that would have appealed to the 18th C. Enlightenment. They look to physics as the firm uncontroversial bedrock for the hierarchical reductionist tower of knowledge. But for physicists, at any rate some physicists, this foundation is itself shifting sand, fraught even with paradox, and quite unsuited to support the towering edifice above it. I want to look at some of these foundations and show in what precise sense they actually serve to undermine reductionism.

I will not be appealing to loosely arguments ~~about~~ of philosophers, or the wishful thinking but to the hard critical, rational examination of the evidence that Peter Atkins so eloquently recommended to us this morning.

But first I want to look at the problem of reduction in a wider setting, ~~and~~ before concentrating on the part-whole reductions that are probably the major interest of this Conference.